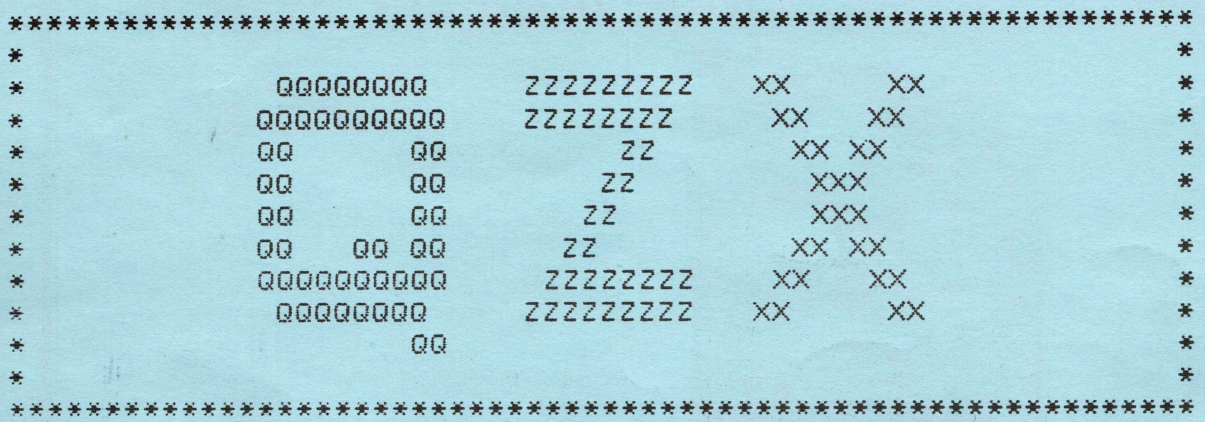
QQQQQQQQ ZZZZZZZZZ XX XX
QQQQQQQQQQ ZZZZZZZZ XX XX
QQ QQ ZZ XX XX
QQ QQ ZZ XXX
QQ QQ ZZ XXX
QQ QQ QQ ZZ XX XX
QQQQQQQQQQ ZZZZZZZZ XX XX
QQQQQQQQ ZZZZZZZZZ XX XX
QQ

The Journal Covering Amateur Radio & Sinclair Computers
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Ambrose 'Bo' Barry,W4GHV/5 Editor

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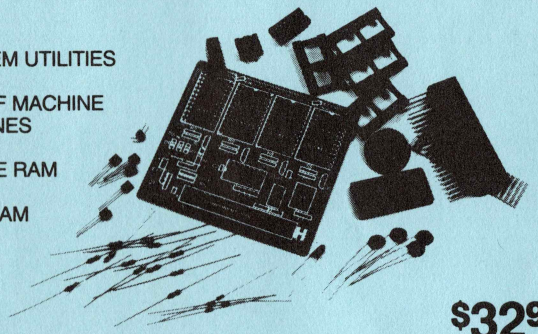

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We found the documentation to be far superior to that (of) most hardware we've received.
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(SYNC Magazine Mar/Apr 83)

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INTRODUCTION

This memory board is designed to fill the transparent 8K block of memory (from 8K to 16K) in a ZX81-16K system. This area of memory is an ideal place to store, either permanently or temporarily, machine language routines or data which are to be used by the BASIC system.

Sample utilities are included with the kit.

The use of HM6116LP 2K CMOS RAM memory IC's with their own reserve power supply means that routines stored in the RAM are nonvolatile — the RAM retains its memory even when the ZX81 is switched off or reset. Moreover, being RAM, the routines you store in the memory are easily modified. The lithium cell supplied with the board will maintain sufficient reserve power for almost ten years.

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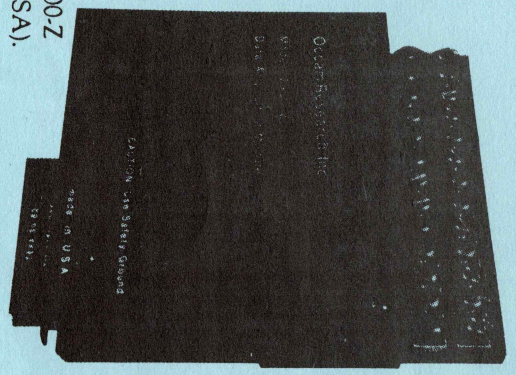

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BUTTERWORTH FILTER DESIGN

by Charles F. Milazzo, KP4MD

This program for the Timex-Sinclair 1000 computer was written for completely automated design of Butterworth low-pass, high-pass, band-pass or band-stop filters. Modern solid-state transmitters are more prone to harmonic and parasitic frequency radiation, and therefore it is desirable for the radio amateur to have access to modern filter design in order to comply with present FCC rules for purity of emissions. Butterworth filters are superior to image-parameter filters (constant-k and m-derived) in their efficiency and response characteristics. For further details on the theory of modern filter design, the reader is referred to recent editions of the Radio Amateur's Handbook and to the text Electronic Filter Design Handbook (Mc-Graw-Hill, 1981) by Arthur B. Williams, from which the formulas used in this program were derived.

The Butterworth filter is composed of a series of "branches" which are alternately connected in series or shunt with the source-to-load path. In low-pass and high-pass filters, each branch is either a capacitor or an inductor. In band-pass and band-stop filters, each branch is either a series or parallel resonant circuit composed of a capacitor and an inductor. (see figures 1 and 2). The first branch of any filter may be selected as either a series or a shunt branch.

Upon running the program, the user must first specify if a low-pass/high-pass or a band-pass/band-stop filter is desired. If the low-pass/high-pass design is chosen, the user must then specify two frequencies in Hz, each followed by the respective attenuation desired (this may be a very small value but never exactly zero). The source resistance must then be specified. The program will then calculate and display the minimum number of branches required for the specifications, and request if the first branch is to be series or shunt. The program will then calculate all required component values rounded to 3 significant digits and displayed in the most common units. The rounding feature may be eliminated by changing statement 830 to "LET X1=X". The program will then provide a table of attenuation vs. frequency for any specified range and increment of frequency.

If the band-pass/band-stop design is selected, the process is similar except that first the center frequency of the filter must be specified, and then two frequency bandwidths with their respective attenuations. These filters are geometrically symmetrical, i.e. the center frequency is not exactly the arithmetic average of the limit frequencies of any bandwidth. The relationship is really $f_c = \sqrt{f_1 x f_2}$.

The given examples demonstrate the use of this program. The first filter designed is a band-stop filter for 11 meters, providing 20 db attenuation over 26.965 to 27.405 MHz (bandwidth of 440 kHz) and only 1 db attenuation over 26.37 to 28.0 MHz (bandwidth of 1.63 MHz). This type of filter may be designed for the input of a linear amplifier to prevent operation on the 11 meter band while permitting operation on the 10 meter band. This filter requires only 3 branches (total of 6 components), and its response over 26 to 28 MHz is shown in the printout.

The second example shows design of a low-pass filter, such as used for TVI suppression.. An attenuation of 30 db is specified at 54 MHz, while a loss of 1 db is specified at 28 MHz. This filter would require 7 elements, and its response over 5 to 55 MHz is shown in the table.

This program offers the radio amateur the ability to synthesize modern Butterworth filter circuits with all calculations performed by a computer. All previously published articles in amateur magazines on this subject present tables of normalized filter values or only a few "typical" values for certain common frequencies. This program offers the full flexibility possible by using the original formulas for synthesis of Butterworth filters. It is possible to write such programs for Chebyshev and other modern filters, and these will require slightly more complicated formula derivations. This is one of the author's future projects for programming on the Timex Sinclair 1000.

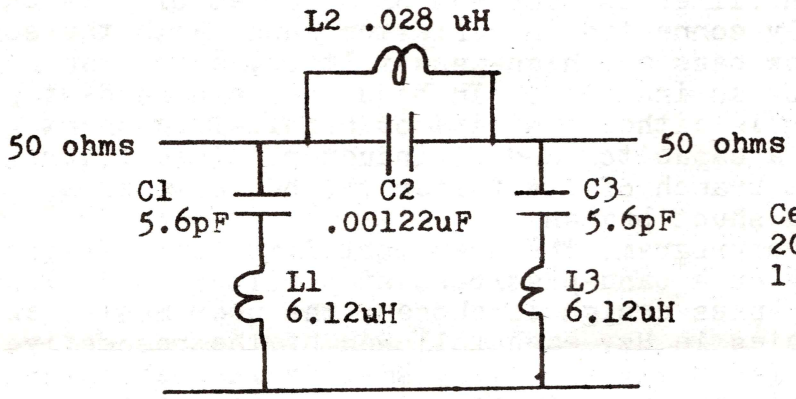

Figure 1. 27 MHz bandstop filter.

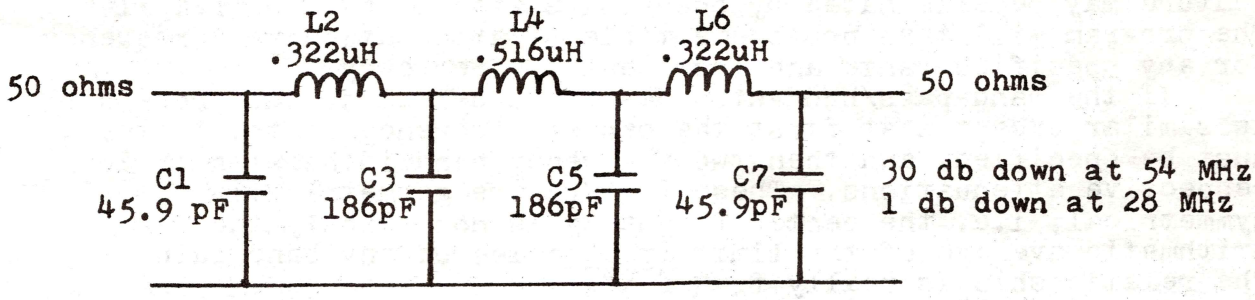

Figure 2. Low-pass filter.

PROGRAM ON FOLLOWING PAGE

```
"FILTER" PROGRAM FOR DESIGN
OF BUTTERWORTH FILTERS
BY CHARLES F. MILAZZO, KP4MD
COMPLETED 1 FEB 1984

  10 DIM A(2)
  20 DIM F(2)
  30 PRINT "BUTTERWORTH FILTER D
ESIGN";"SELECT LOW PASS/HIGH PAS
S (0)","      OR BANDPASS/BANDSTO
P (1)"
  40 INPUT Q
  50 CLS
  55 IF NOT Q THEN GOTO 90
  60 PRINT "CENTER FREQUENCY: ";
  70 INPUT F0
  80 PRINT F0;"    BANDWIDTH"
  90 PRINT AT 3,0;"    FREQUENCY
   ATTENUATION(DB)"
 100 FOR K=1 TO 2
 110 PRINT K;". ";
 120 INPUT F(K)
 130 PRINT F(K),
 140 INPUT A(K)
 150 PRINT A(K)
 160 NEXT K
 170 PRINT "RESISTANCE = ";
 180 INPUT R
 190 PRINT R;" OHMS";;;
 200 LET N=LN ((10**(.1*A(1))-1)
/(10**(.1*A(2))-1))/(2*LN (F(1)/
F(2)))
 210 LET S=SGN N
 220 LET N=INT (ABS N+.9)
 230 PRINT "NO. BRANCHES=";N
 260 LET FC=F(1+(A(1)>A(2)))*(10
**(.1*A(1+(A(1)>A(2)))-1)**(-.5
/S/N)
 270 PRINT "1ST EL. (SERIES=1, S
HUNT=-1) ";
 280 INPUT T
 290 PRINT T
 300 CLS
 310 LET A$="LOW "
 320 LET B$="PASS"
 330 IF S<0 THEN LET A$="HIGH "
 340 IF Q THEN LET A$="BAND"
 350 IF Q AND S<0 THEN LET B$="S
TOP"
 360 PRINT A$;B$;" FILTER COMPON
ENTS";;;
 370 FOR K=1 TO N
 380 PRINT "BRANCH ";K;
 390 IF T>0 THEN PRINT " SERIES"
 400 IF T<0 THEN PRINT " SHUNT"
 410 LET X=(2*SIN ((2*K-1)*PI/2/
N))**S/2/PI/FC*R**(S*T)
 420 GOSUB 800
 430 LET T=-T
 440 IF NOT Q THEN GOTO 500
 450 PRINT " IN ";;;
 460 IF S*T>0 THEN PRINT "PARAL.
U/"
 470 IF S*T<0 THEN PRINT "SERIES
U/"
 480 LET X=1/(4*PI*PI*F0*F0*X)
 490 GOSUB 800
 510 PRINT
 520 NEXT K
 530 COPY
 540 PRINT
 550 PRINT "ATTEN. VS. FREQ."
 560 PRINT "FROM";
 570 INPUT I
 580 PRINT I;"TO";
 590 INPUT J
 600 PRINT J,"IN STEPS OF?"
 610 INPUT K
 620 PRINT K
 630 CLS
 640 PRINT "FREQUENCY HZ","ATTEN
UATION DB"
 650 FOR H=I TO J STEP K
 660 LET H1=H
 670 IF Q THEN LET H1=ABS (H-F0*
F0/H)
 680 PRINT H,10*LN (1+(H1/FC)**(
2*S*N))/LN 10
 690 NEXT H
 700 COPY
 710 INPUT Q$
 720 CLS
 730 GOTO 1
 800 IF S*T>0 THEN PRINT " L";ST
R$ K;" = ";
 810 IF S*T<0 THEN PRINT " C";ST
R$ K;" = ";
 820 LET E=INT (LN X/LN 10)
 830 LET X1=10**(E-2)*INT (X*10*
*(2-E)+.5)
 840 IF E<0 THEN GOTO 870
 850 PRINT X1," ";
 860 GOTO 940
 870 IF E<-3 OR S*T<1 THEN GOTO
900
 880 PRINT 1E3*X1;" M";
 890 GOTO 940
 900 IF E<-9 AND S*T<1 THEN GOTO
 930
 910 PRINT 1E6*X1;" U";
 920 GOTO 940
 930 PRINT 1E12*X1;" P";
 940 IF S*T>0 THEN PRINT "H";
 950 IF S*T<0 THEN PRINT "F";
 960 RETURN
9900 SAVE "FILTER"
9950 RUN
```

SAMPLE RUNS

```
BANDSTOP FILTER FOR 11 METERS
20 DB ATTEN: 26.965 TO 27.405 MHZ
1 DB ATTEN. AT 28.0 MHZ

CENTER FREQUENCY: 27185000

   BANDWIDTH
   FREQUENCY     ATTENUATION(DB)
1. 440000        20
2. 1530000       1
RESISTANCE = 50 OHMS

NO. BRANCHES=3
1ST EL. (SERIES=1, SHUNT=-1) -1

BANDSTOP FILTER COMPONENTS

BRANCH 1 SHUNT
 L1 = 6.12 UH IN SERIES U/
 C1 = 5.6 PF
BRANCH 2 SERIES
 C2 = .00122 UF IN PARAL. U/
 L2 = .028 UH
BRANCH 3 SHUNT
 L3 = 6.12 UH IN SERIES U/
 C3 = 5.6 PF



FREQUENCY HZ     ATTENUATION DB
26000000         0.10273835
26100000         0.17496129
26200000         0.31124634
26300000         0.560021
26400000         1.1286903
26500000         2.2531149
26600000         4.4293554
26700000         8.1439241
26800000         13.577399
26900000         21.404383
27000000         32.684123
27100000         46.995257
27200000         55.242908
27300000         45.214405
27400000         33.962848
27500000         19.105829
27600000         12.18578
27700000         7.8439357
27800000         5.2779707
27900000         3.6779733
28000000         2.6813628
```

```
LOW PASS FILTER
30 DB ATTEN. AT 54 MHZ
1 DB ATTEN. AT 28 MHZ


   FREQUENCY     ATTENUATION(DB)
1. 28000000      1
2. 54000000      30
RESISTANCE = 50 OHMS

NO. BRANCHES=7
1ST EL. (SERIES=1, SHUNT=-1) -1
```

LOW PASS FILTER COMPONENTS

```
BRANCH 1 SHUNT
 C1 = 45.9 PF
BRANCH 2 SERIES
 L2 = 0.322 UH
BRANCH 3 SHUNT
 C3 = 186 PF
BRANCH 4 SERIES
 L4 = 0.515 UH
BRANCH 5 SHUNT
 C5 = 186 PF
BRANCH 6 SERIES
 L6 = 0.322 UH
BRANCH 7 SHUNT
 C7 = 45.9 PF
```

```
FREQUENCY HZ     ATTENUATION DB
5000000          0
10000000         5.1681405E-7
15000000         .000180030821
20000000         .010107901
25000000         0.22420646
30000000         2.2537036
35000000         8.3804788
40000000         15.930315
45000000         23.001189
50000000         29.390423
55000000         35.181716
```

CWSS CW PROGRAM MODS
WAØUZI

CHANGE LINE 203 TO 201

CHANGE LINE 204 TO 202

ADD...

```
203 PRINT "       "P" FOR PRACTIC
E
LINE 210... AND A$<>"P"  (THEN S
TOP)

ALSO ADD...
3000 CLS
3005 LET L=0
3006 LET M=0
3010 PRINT ,,"       PRACTICE MODE
"
3015 PRINT ,,"ENTER PRACTICE NUM
BER: 0-2"
3020 SLOW
3022 IF L=1 OR M=1 THEN GOTO 305
0
3025 IF INKEY$="" THEN GOTO 3025
3030 LET A$=INKEY$
3033 CLS
3035 IF A$=CHR$ 118 THEN GOTO 16
5
3040 FAST
3045 LET A=CODE A$-28
3050 PRINT AT 23-PEEK 16442,0;"
   ";TAB 21;A;"  "
3055 IF L=1 THEN PRINT ,,"UNABLE
 TO TRANSMIT ";A$(K)
3056 IF M=1 THEN PRINT ,,"MESSAG
E IS TOO LONG"
3060 PRINT AT 0,0;"ENTER ""*"" T
O PRACTICE","ALL LETTERS, NUMBER
S, AND","PUNCTUATION..","OR JUST
 ENTER","THE CHARACTERS YOU WISH
 TO","PRACTICE."
3061 SLOW
3062 LET P$=""
3065 INPUT P$
3066 CLS
3067 FAST
3070 LET A$=""
3072 LET B$="ABCDEFGHIJKLMNOPQRS
TUVWXYZ1234567890.,/?:;()=-"
3075 IF P$="*" THEN LET P$=B$
3080 RAND
3085 LET P=LEN P$
3090 FOR N=1 TO 125
3095 LET Q=INT (RND*(P))+1
3100 LET C$=P$(Q)
3105 LET A$=A$+C$
3110 IF N=5 OR N=10 OR N=15 OR N
=20 OR N=25 OR N=30 OR N=35 OR N
=40 OR N=45 OR N=50 OR N=55 OR N
=60 OR N=65 OR N=70 OR N=75 OR N
=80 OR N=85 OR N=90 OR N=95 OR N
=100 OR N=105 OR N=110 OR N=115
OR N=120 THEN GOSUB 5000
3115 NEXT N
3120 SLOW
3125 PRINT ,,"PRESS ENTER"
3126 INPUT Z$
3130 LET A$=A$+Z$
3135 FAST
3140 GOTO 575
5000 LET A$=A$+" "
5005 RETURN
9000 SAVE "CWSS"
```

A few more comments on Cliff Nunnery's RTTY program "NRAP", by W1FYR

The program is super. It certainly gives you all the nice things that are needed in a good RTTY program. Those have been well covered in previous articles. Cliff has done a super job.

Interfacing problems with various transceivers will have to be solved on a one by one basis. Here are some comments on how I interfaced it to my equipment, which consists of a Flesher TU-170 and a Kenwood 820-S transceiver and Dentron Clipperton L Amp.

From the Flesher TU-170, the RT-1A needed to have an inverted input at SIN. I tried this first using a Jury-rigged hex inverter chip, and it worked fine. I then substituted a PNP transistor for the 2N2222, reversed the emitter and collector, and lo and behold it worked like a dream! (The TU-170 has TTL levels out and in.)

My transceiver is a Kenwood 820-S and it loved the SOUT just as it came from the board (into the FSK jack of course). Had we needed AFSK we would have gone back into the TU with SOUT. My other transceiver is an ICOM 740, and it requires TTL signals to key the FSK system in it. So I think I will wire up another jumper and by-pass the 2N2222 to give me the TTL level required. I have not used the "PTT" line on the board. I throw the switch instead!

I run about 800 watts using this setup, with a full sized keyboard on the Sinclair ZX81, all in a metal box and shielded in-out leads. The RT-1A board is not shielded. I have no problems with RF even at full power.

The board went together easily and worked the first time it was plugged in, in spite of the fact that parts (excepting the big chip) were all junk box.

The board requires a small pencil type iron and some care to prevent solder bridges. (I usually work on this stuff with a magnifying glass). The age old problem with "wobble and lose it" is still with us, and the more you hang out the back, the more you run the risk. Make it a point to keep the contacts clean and the add-ons snugged in tightly. I have also mounted a thin piece of soft foam under the whole mess, and this has pretty much cured the problem.

The program is a joy to use. I made up a little card with the key entry instructions on it. (It is a complex program!) With 16K you have a 9000 character receive buffer and a 1500 character type ahead buffer, plus 10 messages. The program is foolproof if you hit the right keys! It even tells you when you run out of room in each of your buffers!

I have used a number of different RTTY programs on a number of computers, including the Apple II. Cliff's program stands up there with the best of them! If you are using the Sinclair printer you will have to go into receive review mode before you print, but then you can "copy the screen". It works fine.

For an investment of about $45 (not including the computer) you will end up with a RTTY machine that will certainly stand up to the best of them! I have been enjoying it very much, even tho my first love (and continuing love) is for the mechanical monsters - Teletype Models 32 & 33. The Timex is quieter, I will say that for it!

I'll be glad to help on interface problems if I can - S.A.S.E. please to 115 Tanglewood Estates, Keene, N.H. 03431.

Editor's Doings
Bo Barry, W4GHV

Alex overwhelmed me with material for this issue, we picked up a couple ads, and I am trying to get both March & April issues ready. Hence, 3 1/2 inches for me! First, note the Hunter ad. I have some ordered and he mentioned a possible small price increase from his supplier. So now is a good time to take advantage of his offer. One of my summer projects is to provide EPROM service for popular QZX software, allowing 'instant-on' running with the Hunter board. I hope to get the NRAP RTTY program put in EPROM. In the next issue I hope to have comments on the 68000 Sinclair, some words (and more thanks) for the color interface article, HOT Z-II info, plus lots articles all ready to go. Also received was a schematic of the TS1500. Sure enough the tape input circuit is different (R/C changes & a transistor inverter). Details next month. 73, Bo

TS2068 64 COLUMN DISPLAY

One of the really nice features of the new Timex TS2068 is its 64 column mode. But it is not as simple as turning a switch. As you probably know, when you use the wide mode, the computer opens a second display file with a starting address of 24576. Prior to the second display file this memory contained the stack as well as other machine variables.

The first thing, then is to clear that area in such a way so that the stack is maintained but safely out of the way. The following routine will accomplish that and then leave you in the 64 column mode:

```
243  62   1    211  244  219  255
2Ø3  255  211  255  62   62   245
251  2Ø5  142  14   243  219  255
2Ø3  191  211  255  175  211  244
241  254  128  32   3    5Ø   194
92   251  2Ø1
```

Poke this data into protected ram and then save the routine to tape. By the way, the 13th byte is the display mode designator, poke Ø and you return to the standard mode. When you call this routine, it leaves you with a 64 column display with white characters on a black background.

Now if you try to list the loader or put anything else on the screen, you will find that every other print position is a space and that is because the ROM can only print to the primary display file.

To get around this we can, through our own routine, print to the second display file. But first, a couple of things you should know; the display files are set up differently in the 2068 then in the 1000. Each character is made up of 8 lines, consequently each print row is made up of 8 lines. The display information is stored by lines, the first line of the first row (32 characters per row) then the first line of the second row. This continues until the first line of the first eight rows are stored, then it starts over with the second line of the first row and so on until the first eight rows are on the screen. The second 8 rows are stored the same way and then the last eight lines.

What this boils down to is that 256 bytes after a specific address, is the line directly underneath the previous address. So if we know the print position (that is the address of the first line) then we can print each line of the character by adding 256 to the previous address.

Secondly, the table that contains the data needed to form each of the characters begins at 15616. So if we use this as the base address and add to that the code (with some manipulation) of the character that we want to print, we will have the address of the pixel data for that character.

In the listing below, assume that we want to print the letter "A" at the first print position in display file #2.

```
START   LD  A,65   (code for "A")
        SUB 32
        LD  DE,15616
        LD  H,Ø
        LD  L,A
        ADD HL,HL
        ADD HL,HL
        ADD HL,HL
        ADD HL,DE
        LD  DE,24576
        LD  B,8
PRINT   LD  A,(HL)
        LD  (DE),A
        INC D
        INC HL
        DJNZ,PRINT
        RET
```

This will leave the letter "A" in the first position of file #2 and that is position Ø,1 of the expanded display mode. To erase it print a space (code 32) in its place. Here is the list of decimal codes to poke:

```
62   x    214  32   17   Ø    61
38   Ø    111  41   41   41   25
17   y    z    6    8    126  18
2Ø   35   16   25Ø  2Ø1
```

Where x is the code for the letter that you want to print, z is the msb and y is the lsb of the address to be printed.

You can incorporate this routine in your program but you will have to keep track of your print position.

73's and CUL N8BIF

TIMEX OUT OF MARKET

K5XY

Timex Computer Corporation announced February 22 that they were withdrawing from the home computer market. The announcement was a big blow to those who have worked hard to support their fine computers.

Presumably the reason for the withdrawal was that the company figured tha they could not make enough money under the present circumstances. Timex is a closely held company that reports as little about its finances as possible; so no information is available about any possible loses its computer arm might have had. It was known that many dealers were dissatisfied with relations and that there had been quite a bit of high level personnel turnover in the computer division.

It has been estimated that about 200,000 Timex 2068's remain to be sold. Efforts will be made to keep the price as high as possible, but some bargains are sure to be had. QZX has been able to find no estimate of the number of Timex 1500's left and has no idea of the availability of T/S 1000's. W6FGE sent us a copy of an ad in the March 10 issue of Nuts and Bolts which offered TS1000's for $13 without accessories. The ZX81 had long been absent from the market.

It is impossible to predict close-out prices. TI home computers were cut in price drastically. QZX does not look for the 2068 to be cut that much. Certainly the accessories for the Timex will not be cut as much as the TI accessories because they were not as overpriced to begin with. QZX has seen some accessorites selling for half price and we have heared reports of the computers selling for about 50% off too. Rumors have said that Timex has several thousand of the modems for the 2068 and that they will ship those ordered from them. It seems unlikely that the 80 column printer for the 2068 will see the light of day.

The computers were a good buy at the regular price, anything lower is a bargain. Do not, however, buy anything in anticipation of future delivery of any component of the desired system. What you see is probablly all you will get.

The future is always hard to predict, especially in the computer field. All we can say is that QZX will continue to be published. In fact, as programmers and hardware designers turn their attention to other machines, communications between Timex Sinclair users becomes more important. Fortunately, hams make good programmers and haedware deaigners; so your QZX subscription should increase in value.

An interview with Nigel Searle, the managing director of Sinclair Research, produces the information that Sinclair has no plans to reenter the US market with its ZX81 or Spectrum which are still selling well in Great Britain. Sinclair is coming out with a new computer, the QL (for quantum leap), a 32 bit machine. It is currently priced at the equivalent of $580 and is planned for introduction, by mail order, into the US sometime during the second half of this year. Searl said that Sinclair is talking to potential US distributers including, surprisingly enough, Timex.

Meanwhile remember that your Z80 won't stop just because Timex did.

A Short WP Reveiw

AJ6T

Gesso Software has a word processor progran for the T/S 2068 and the 32 column printer. It is call "WP 32". The best feature of this program is that you print exactly what is shown on the screen. It is easy to outtype this processor if you are a good touch typist. I rate it fair to good, certainly better than versions for the ZX81.

UNCLASSIFIED ADS

WANTED: UNCLASSIFIED ADS for publication in QZX. Cost is 1 cent for each keystroke (characters, blanks, etc.). Payment must be included with order. This is an excellent way to sell your program or unwanted equipment, ask for help, or find a specific program. Send your ad with payment to QZX, 2025 O'Donnell, Las Cruces, NM 88001.

FOR SALE: ZX81/TS1000 edgeboard wire-wrap connectors; keyed; bifurcated contacts; manufactured by TI; $5.00 each. Pc piggy-back extender boards; $1.50 each. Economical experimenting with Radio-Shack's 276-158 and 161 project boaeds and these connectors. Add $0.75 shipping per order. Paul Hunter, 1630 Forest Hills Drive, Okemos, MI 48864.

WANTED: Source for GE V130LA10A MOV or eqiv. WB3AIT Ed Wickett, RD#1 Box 83, E. Branch Dam, Wilcox, PA 15870.

FOR SALE: Surplus keyboards suitable for T/S 1000. $30.00 including postage. Edge connectors. Edge connectors sold out. For details on adding the keyboards to the ZX81 and T/S computers see Dec '82 QZX. Alex. F. Burr, 2025 O'Donnell, Las Cruces, NM 88001.

MINIREVIEWS

K6MLZ

One product I can highly recommend to users is the Upstate Labs Eprom Programmer at $39.95. It will program 2716, 2732, 2732A, and 2764 Eproms. The kit is complete except for a ZIF socket and high voltage (27-32V) power suply. The menu driven machine code software comes in two versions for low memory (14-16K) and high memory (30-31K). It is set up for different types of EPROM via an 8 position dip switch. It programs and verifies in one step and is very easy to use. The printed circuit board is high quality with plated though holes and also works with the Spectrum and presumably the T/S 2068. All in all an excellent product and the price is right.

The utility software to transfer a basic program to 8-16K based on a merge program given in the Hunter manual is available fron K6MLZ, 701 Carquinez Way, Martinez, CA 94553, if a self-addressed envelope is included with the request. You can then try instant loading software in Eprom.

Another excellent product is the ByteBack RS 232/modem. The new case matches the ZX T/S 1000 profile very well and fits snuggly with no wobble problems. The modem and RS 232 port are now on one printed circuit board instead of two. The new MD-2 software is super. It comes in two versions for 2K or 16K. Even the limited 2K version is quite adequate for communication with Compuserve and most bulletin boards that follow the standard protocol of ^S (controll S) to halt. The software sends the proper codes and starts the printer each time the screen fills up. The only problen is the high phone bills one gets.

NEW PRODUCT

Fred Nachbaur

Check out the new toolkit by Pete Hoffman, Delphic Enterprises, Box 72205, Corput Christie, TX 78472. They supply EPROMs for $18, with the Hunter board specifically in mind. It includes the best renumber routine I've seen yet (lets yuou renumber only part of a program if you want) as well as free bytes, protect (extract) and merge, copy, delete, unlock, REM kill, and (yes, folks) string search. All in 2K, and ALL RELOCATABLE! I found this program so good that I asked Pete about distributing it in cassette form, for those poor unfortunates who don't have a Hunter board, and much to my delight he agreed, since they're not interested in messing with tapes. So as soon as I complete our catalog (yet another thing I've got to get done) the Delphic toolkit will occupy one of the spotlights. The tape will include an info screen and "auto-boot". It will be ready as soon as I touch it up and write the additional documentation.

INDEX!! INDEX!!

KA2LHO has been working on an index of articles and programs in the "new" QZX since it started up again. It has now been completed through this issue by the use of the TIMEX software package "VU-FILE". He says that he will make the index available on tape to any QZX subscriber who sends him a tape an eturn postage. The program is very versatile and allows search by any character, string of characters, numbers, or catetory. A printout is also an option with the list being ordered by any user selected category. He will also update the index as each new issue is received. To take advantage of this generous offer send your tape and postage to Kraig D. Pritts, KA2LHO, Box 198, Leonardsville, NY, 13364. Be sure you state which volumes you wish, Volume 1, Volume 2, or both. Each index requires about 6 and one half minutes of tape so send the right length.

QZX FRIENDS

K7HSX -- Cliff has modified the TSmuf-4 program for his new T/S 2068. He likes it except for the symbol shift key which he thinks was designed by someone with six fingers and excellent dexterity.

WA5SJG -- Mike says that he enjoys QZX although his T/S 1000 is frustrating at times. He uses it to track the satellites. He might get a T/S 2068 if the software on the T/S 1000 is compatible. (In general, it will not be -- see table in Nov QZX for differences. K5XY)

KD6TO -- Dave is having a little trouble getting AF8J's RTTY program to run on the same 16K machine that he uses for NU4V's cw program.

WB4TDB -- Vollie suggests that one obtain an extra T/S 1000 to loan out to people. He says that he has loaned his out to quite a few people over the last few months and quite a number of them are now in the hobby of micro computing. In his local ham club there was at least one member who was very anti-computer and is now very pro T/S 1000. And a second one who has put his TI-99/4a on the back burner for the T/S 1000.

KA4RKZ -- Jim has cased his Timex in a Gladstone keyboard unit and added a Memotech interface, word processer, 32K memory, and a Seikosha printer. The word processer is super when it works, but he has had it back to Memotech four times now and this time they are charging for repair. As a result he wrote this letter with a short typing program.

KA6BCO -- Bix writes "I am a tech and still trying for 13 WPM. I now have two of the T/S 1000. The last one I bought at K-Mart for $29.95. I am typing this on a Suntronics keyboard and have one of the stickon keyboards on the other unit. I now have a Z-Dubber and it has been a big help, especially with some of the prerecorded tapes. I recently bought a new cassette player, a G. E. model that is for use with computers. It seems to be working well also although the volume control is very sensitive.

WB5HVS -- Roy renewed, contributed toward the expenses, and wrote that he was working with a ZX81 with 80K RAM, Byte Back MD-2 modem, Gorilla Banana printer with Memotech centronics interface, and a NU4V cw interface with RTTY on the way.

WA3VRJ -- Chuck has a T/S 1000 with Suntronics keyboard. He threw out the connecting cable and wired it direct. He uses it on CW with the NU4V program.

W8NFQ -- Ed has a kit ZX81 and a T/S 1000 he bought for $20. He has a fine dup check, log writer, and alpha-mumeric print out program for field day running. It will be completely functional when he gets the hardware time-of-day clock going.

WB0ROQ -- Harley has a big keyboard on his T/S 1000 and 16K RAM. He is building the E-Z Loader from Computer & Electronics magazine.

VE7CZJ -- John has a ZX81 which he uses with the NU4V cw program. He has also added a full keyboard. He also has direct video to a 12" TV using the method shown by K8CG in April 83 Ham Radio plus the white on black display by character inversion as shown in the article by Steve Pense in Computer and Electronics of May 83. All systems work beautifully, are

reasonablely simple and cheap so he recommends them to anyone. He says thet the white on black characters are a lot clearer and much easier on the eyes.

WB4ENB -- John ownes a ZX80, ZX81, T/S 1500 (serial nr. 25), and a T/S 2068. He uses NU4V's CWSS program on the ZX81 with a large keyboard and homemade interface.

W8FXZ -- Dick has three Sinclairs, a ZX80 for tinkering, a ZX81 for use at work, and a T/S 1000 for use in ham radio. He is waiting for a 2068 and is looking at the new QL which Sinclair has announced for Great Britain.

WB3AIT -- Ed has a ZX-81 built from a kit and 16K of RAM. He says the NU4V cwss system is a delight to use. His next favorite program is the DXCC one by W3ZQN. The ZX-81 is also used often for "salt mine" home work.

K6MLZ -- Glynn has a ZX 81 UHF kit with internal 16K RAM. He also has a T/S 2040 printer, Hunter board, and ByteBack modem. He has an EPROM burner too.

WA4WYZ -- Dave is going to use his ZX81 and printer strictly for Ham Radio since the family received a Commodore 64 for Christmas.

W9BS -- Jerry has a ZX81 converted for direct video. He has added a push-button reset switch, and a level meter and small speaker for loading ease.

K2MI -- Marty got a filesixty keyboard for Christmas and likes it. He also still has a few back issue sets of the old QZX.

KA8RNY -- Bill has been having some trouble getting his copies of Timex Sinclair User magazine (not the same as T S User).

VE1BRA -- Murray is using the NU4V RTTY program with the MFJ-1224 tuning unit and says that it seems to work very well through the QRM.

BITS AND BYTES

37 W8FXZ/9 has an item concerning some keyboard problems. When he had to replace a keyboard he noticed that there are several different membrane keyboard styles. His original did not have an exposed conductor once the end was broken off of the wires to the main circuit board. His suggestion in this case is a Berg 65801 - 005 (or -008 for 8 pin) clamp-style connector. These clamp through the cable to make connection with the internal deposited conductor. The mating connector is just a row of #18 wires.

38 WA6DLI suggests that if you can not get paper fo the Timex printer that you try Radio Shack TP-10 paper.

39 W4DRM had TVI trouble with his new TS2068. He cured the problem by running the monitor output into a UHF modulator and then running that output to a color TV set.

PUBLISHER'S NOTES

The renewals continue to come in although the renewal rate (about 50%) is not fantastic as people change computers. We really appreciate the good words that many enclose. I am tempted to put more of them in the friends column, but I do not like it when other magazines publish congratulatory letters so I have refrained. Reality comes along too as with the letter from VE2LI who writes "Pleased with what I have received except for the very very poor printing of some programs which are quite impossible to read." Unfortunately is some cases he is correct. We try to give you the best copy available, but sometimes the listings furnished us have some rough spots in them. We would introduce more errors than we would correct if we retyped them, and we do not have time to do that anyway. The printer that we now use does wonders with some of the stuff we give him. Sometimes odd things happen too, like the time the postmark on one contributor's letter soaked through the envelope onto the listing inside.

Please do not send anymore copies of the issue of Timex Sinclair User that Bo asked for. Thanks to your generosity he now has enough to start a small paper drive. Speaking of that magazine, there have been a number of complaints about subscription fulfillment (or the lack thereof).

73, W4GHV and K5XY

QZX presents the best software and hardware projects available for the radio amateur. While the contents are believed to be accurate, no warranty is extended on any program or project. No investigation has been made of the claims or reputation of any advertiser. It would be greatly appreciated if all correspondance requiring an answer would be accompanied by a self stamped envelope (SASE). Copyright by QZX, 1983. All rights reserved, Photocopying by permission only.

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